

**SUMMARY OF 2010
MASSACHUSETTS PIPING PLOVER CENSUS**

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ABSTRACT

This report summarizes data on abundance, distribution, and reproductive success of Piping Plovers (*Charadrius melodus*) in Massachusetts during the 2010 breeding season. Observers reported breeding pairs of Piping Plovers at 129 sites; 119 additional sites were surveyed at least once, but no breeding pairs were detected at them. The *Index Count* (statewide census conducted 1-9 June) was 573 pairs, and the *Adjusted Total Count* (estimated total number of breeding pairs statewide for the entire season) was 591 pairs. Overall statewide productivity was 1.50 chicks fledged per pair, based on data reported for 583 of 591 pairs (99%).

INTRODUCTION

Piping Plovers are small, sand-colored shorebirds that nest on sandy beaches and dunes along the Atlantic Coast from North Carolina to Newfoundland. The U.S. Atlantic Coast population of Piping Plovers has been federally listed as *Threatened*, pursuant to the U.S. Endangered Species Act, since 1986. The species also is listed as *Threatened* by the Massachusetts Division of Fisheries and Wildlife pursuant to Massachusetts' Endangered Species Act.

Population monitoring is an integral part of recovery efforts for Atlantic Coast Piping Plovers (U.S. Fish and Wildlife Service 1996, Hecht and Melvin 2009 a, b). It allows wildlife managers to identify limiting factors, assess effects of management actions and regulatory protection, and track progress toward recovery. In this report, we summarize data on abundance, distribution, and reproductive success of Piping Plovers breeding in Massachusetts in 2010, as observed and reported by a coast-wide network of cooperators.

METHODS

Monitoring and management of Piping Plovers and other coastal waterbirds in Massachusetts is carried out by a coast-wide group of cooperators that includes wildlife biologists, seasonal shorebird monitors, beach managers, researchers, and volunteers affiliated with over 30 federal and state agencies, local municipalities, local and regional land trusts, private conservation organizations, and universities. Data summarized in this report were contributed by over 80 individuals. Cooperators monitored a total of 248 sites in Massachusetts in 2010 for the presence of breeding Piping Plovers.

Abundance

We measure abundance of Piping Plovers in terms of breeding pairs, defined as pairs observed with either a nest or unfledged chicks or that exhibited site tenacity and evidence of pair bonding and territoriality for at least two weeks. We report three different measures of abundance: the *Index Count*, *Unadjusted Total Count*, and *Adjusted Total Count*. The *Index Count*, as reported since 1990, is the total number of pairs tallied statewide each year during a 9-day count period in late May and early June, standardized each year for the entire Atlantic Coast. In 2010, the *Index Count* period was 1-9 June. The objective of the *Index Count* is to estimate population size with a minimum of double-counting of pairs that may move between or within sites, thereby providing an index to population trends that is likely to be more precise than counts based on observations made over the entire breeding season. The *Index Count* likely minimizes double-counting because it occurs over such a short time period. However, it probably underestimates actual number of breeding pairs because it does not include pairs that leave the state before, arrive after, or are present but simply go undetected during the 9-day *Index Count* period.

For sites for which "0" is reported for the Index Count but "nd" is reported for the Total Count, this indicates that the site was surveyed during the Index Count period (1-9 June) and no breeding pairs were detected, but during the rest of the breeding season it was either not surveyed, or was surveyed too infrequently during May and June to confidently conclude that no pairs were present for at least 2 weeks.

Since 2000, we have reported two different "Total Counts". The *Unadjusted Total Count* is simply a tally of the total number of pairs reported for all sites over the course of the entire nesting season, with limited effort made to adjust for any pairs that may have been double-counted if they nested unsuccessfully at one location and then re-nested at another. We then derive an *Adjusted Total Count* by calculating the average of the *Index Count* and the *Unadjusted Total Count*, rounded to the nearest whole number of pairs.

The *Unadjusted Total Count* likely overestimates the actual population by double-counting pairs that establish nesting territories at more than one location in a given year. Without color-banded birds, however, it is impossible to accurately determine whether late-nesting pairs may have nested earlier at a different site, or simply did not arrive or begin breeding activities until June. It is too subjective and, likely, inaccurate to try and adjust the *Total Count* of pairs each year by not tallying late-nesting pairs (*i.e.*, pairs reported as "new" pairs that nested after the first week in June), based on the assumption that these birds were probably already counted earlier in the season. We believe that the *Adjusted Total Count* is the most accurate estimate of the actual number of breeding pairs in Massachusetts because it falls midway between the *Index Count* and *Unadjusted Total Count*, which we suspect slightly underestimate and overestimate, respectively, the actual breeding population.

Reproductive success

The primary measure of reproductive success that we report is *Productivity*, measured as number of chicks fledged per pair. The denominator of this ratio is the number of breeding pairs for which fledging data were reported; this includes not only pairs that successfully fledged chicks, but also pairs that cooperators believed did not nest, pairs that nested unsuccessfully (eggs did not survive to hatch), and pairs whose chicks failed to fledge. Since 2000, we have reported two different estimates of *Number of pairs with fledge data*. As with counts of breeding pairs, estimates of the number of pairs for which fledging data are reported will be biased if double-counting of pairs occurs. Double-counting will overestimate the number of pairs in the denominator of the productivity ratio, and thereby will underestimate actual productivity. To reduce the potential bias associated with double-counting, we multiply the *Unadjusted number of pairs with fledge data* (a tally of the total number of pairs with fledge data reported for all sites, with limited effort made to adjust for pairs that may have been double-counted) by the ratio of the *Adjusted Total Count* to the *Unadjusted Total Count* to arrive at the *Adjusted number of pairs with fledge data*.

Data reporting and quality control

All data were reported by cooperators who filled out a standard Massachusetts Piping Plover Census Form for each site monitored. These forms are used to report data on number of breeding pairs (*Index Count* and *Total Count*); frequency of site visits; design(s) and installation dates of predator exclosures; dates of nest discovery, completion, and hatching or failure; number of eggs on the date the nest was discovered; total numbers of eggs laid, eggs hatched, and chicks fledged; reasons for egg and chick loss, if determined; and comments regarding census results, limiting factors, and management needs. Maps of sites showing the locations of all nests were submitted with census forms. After reviewing census forms, if necessary, we contacted cooperators to obtain missing or incomplete data, resolve inconsistencies, and clarify ambiguities.

RESULTS

Observers reported breeding Piping Plovers at 129 sites in Massachusetts in 2010. An additional 119 sites were surveyed one or more times during May and June, but no breeding pairs were detected at them (Table 1).

The *Adjusted Total Count* in 2010 was 591 pairs (Table 1). The *Index Count* in 2010 was 573 pairs, or 97% of the *Adjusted Total Count*. A total of 876 chicks were reported fledged in 2010, resulting in overall productivity of 1.50 chicks fledged per pair, based on data from 583 of 591 (99%) pairs (Table 1). By comparison, in 2009 the *Index Count* was 574 pairs, the *Adjusted Total Count* was 593 pairs, and overall productivity was 0.91 chicks fledged per pair (Melvin 2010).

Two regions harbored 61% of the total breeding pairs in the state in 2010: the Lower Cape (37%) and the Upper Cape (24%) (Table 1). Individual sites with the largest

numbers of pairs (*Total Count*) were South Beach, Chatham (46 pairs), Sandy Neck, Barnstable (38 pairs), South Monomoy Island, Chatham (33 pairs), Crane Beach, Ipswich (32 pairs), Nauset Spit, Orleans (21 pairs), Plymouth Long Beach, Plymouth (19 pairs), Springhill Beach, Sandwich (14 pairs), Race Point-South, Provincetown/Truro (14 pairs), Parker River National Wildlife Refuge, Newbury and Rowley (13 pairs), and Little Beach/Barneys Joy, Dartmouth (13 pairs). Although the 15 largest sites, *i.e.*, those with ≥ 10 pairs, supported 50% of all pairs in the state, the 83 smallest sites (1-3 pairs) were also important, collectively accounting for 24% of all pairs.

ACKNOWLEDGEMENTS

We extend our sincere thanks to the many biologists, seasonal shorebird monitors, beach managers, landowners, and volunteers who participated in conservation efforts on behalf of Piping Plovers and other coastal waterbirds in Massachusetts in 2010. We also thank the more than 30 state and federal agencies, local municipalities and county government, local and regional land trusts, private conservation organizations, and universities that supported their efforts. We especially thank all the individuals who participated in population monitoring and submitted the data that are summarized in this report.

LITERATURE CITED

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Table 1. Abundance, distribution, and productivity of Piping Plovers in Massachusetts, 2010.

Location	<u>Number of pairs</u>		No. chicks fledged ^c	No. pairs with fledge data ^c	Source ^d
	Index Count ^a	Total Count ^b			
NORTH SHORE					
North Salisbury Beach, Salisbury ^e	0	0	0	0	DCR
South Salisbury Beach, Salisbury ^e	0	0	0	0	DCR
Plum Island town beaches, Newburyport/Newbury	0	0	0	0	USFWS
Parker River NWR, Newbury/Rowley	11	13	31	13	USFWS
Sandy Point State Res., Ipswich	3	3	3	3	USFWS
Crane Beach, Ipswich	31	32	55	32	TTOR
Coffin's Beach, Gloucester	0	0	0	0	DFW
Wingaersheek Beach, Gloucester	0	0	0	0	DFW
Good Harbor Beach, Gloucester	nd ^f	nd	nd	nd	nd
Revere Beach, Revere	3	3	11	3	MAS, DCR
Winthrop Beach, Winthrop	2	2	3	2	MAS, DCR
Yirrell Beach, Winthrop	3	3	3	3	MAS
SOUTH SHORE					
The Glades, Scituate	0	nd	nd	0	MAS
Third Cliff, Scituate	4 ^g	4 ^g	8	4 ^g	MAS
Fourth Cliff, Scituate	1 ^g	2 ^g	0	2 ^g	MAS
Humarock, Scituate	0	0	0	0	MAS
Rexhame Beach, Marshfield	0	0	0	0	MAS
Duxbury Beach, Duxbury/Plymouth	10	11	17	11	MAS, Duxbury
Saquish, Plymouth ^h	0	nd	nd	0	MAS
Plymouth Long Beach, Plymouth	18	19	25	19	Plymouth
Ellisville, Plymouth ⁱ	4	4	4	4	FEM, MAS

Location	<u>Number of pairs</u>		No. chicks fledged ^c	No. pairs with fledge data ^c	Source ^d
	Index Count ^a	Total Count ^b			
Sagamore Beach, Bourne, Sandwich, and Plymouth	3	5	1	5	MAS
Scusset Beach State Res., Sandwich	1	1	0	1	MAS
UPPER CAPE					
Mashnee Dike, Bourne	0 ^j	1 ^j	0	1 ^j	ACOE
Bassetts Island, Bourne	0	nd	nd	0	MAS
Old Silver Beach, Falmouth	nd	nd	nd	nd	nd
Little Island Beach, Falmouth	0	nd	nd	0	MAS
Chappaquoit Beach, Falmouth	0	nd	nd	0	MAS
Black Beach, Falmouth	1	1	4	1	MAS
Sippewisset, Falmouth	3	3	11	3	MAS
Woodneck Beach, Falmouth	0	nd	nd	0	MAS
Falmouth Heights, Falmouth	0	nd	nd	0	MAS
Acapesket Beach, Falmouth	0	nd	nd	0	MAS
Menauhant Beach, Falmouth	0	nd	nd	0	MAS
Menauhant Yacht Club Beach, Falmouth	0	0	0	0	WBNRR
Washburn Island, Falmouth	3	3	1	3	WBNERR
South Cape Beach, Mashpee	4	4	5	4	WBNERR
New Seabury, Mashpee	1 ^k	1 ^k	0 ^k	1 ^k	WBNERR
Rock Landing/Maushop Village, Mashpee	0	nd	nd	0	MAS
Popponesset Spit, Mashpee	1	2	0	2	MAS
Town Neck Beach, Sandwich	4	4	5	4	MAS
Springhill Beach, Sandwich	14	14	23	14	MAS
East Sandwich Beach, Sandwich	6	6	20	6	MAS
Scorton (Neck) Creek, Sandwich	6	6.5 ^l	4	6.5 ^l	MAS
Scorton Shores, Sandwich ^m	5	5	3	5	MAS

Location	<u>Number of pairs</u>		No. chicks fledged ^c	No. pairs with fledge data ^c	Source ^d
	Index Count ^a	Total Count ^b			
Sandy Neck, Barnstable	37	38	60	38	Barnstable
Rushy Marsh Pond Beach, Barnstable	nd	nd	nd	nd	nd
Loop Beach, Barnstable	0	nd	nd	0	MAS
Sampson's Is.-Dead Neck, Barnstable	12	12	13	12	MAS
Bone Hill Road, Barnstable	0	nd	nd	0	MAS
Dowses Beach, Barnstable	2	2	0	2	Barnstable
Long Beach, Barnstable	3	5	0	5	MAS
Craigville Beach, Barnstable	1	1	1	1	MAS
Memorial Beach, Barnstable	0	nd	nd	0	MAS
Squaw Island, Barnstable	2	4	3	4	MAS
Squaw Is. Causeway, Barnstable	0	0	0	0	MAS
Sea St./ Keyes Beach, Barnstable	0	nd	nd	0	MAS
Kalmus Park Beach, Barnstable	8	8	14	8	Barnstable
Fortes Beach, Barnstable	0	nd	nd	0	MAS
Colonial Acres-Standish Way, Yarmouth	0	nd	nd	0	MAS
Gray's Beach, Yarmouth	0 ⁿ	0 ⁿ	0	0 ⁿ	MAS
Great Island – Smith Point, Yarmouth	2	2	0	2	MAS
Great Island Causeway, Yarmouth	1	1	3	1	MAS
Radio City Beach, Yarmouth	1	1	4	1	MAS
Seagull Beach, Yarmouth	3 ^o	3 ^o	4	3 ^o	MAS
Red Jacket Inn, Yarmouth	nd ^o	1 ^o	0	1 ^o	MAS
Bass River Beach, Yarmouth	0	nd	nd	0	MAS
West Dennis Beach, Dennis	4	5	13	5	Dennis, MAS
South Village Beach, Dennis	1 ^p	1 ^p	2	1 ^p	Dennis, MAS
Miramar Beach (Swan River), Dennis	1 ^p	2 ^p	4	2 ^p	Dennis, MAS
Haigis Beach, Dennis	0	0	0	0	Dennis, MAS
Glendon Road Beach, Dennis	0	0	0	0	Dennis, MAS

Location	<u>Number of pairs</u>		No. chicks fledged ^c	No. pairs with fledge data ^c	Source ^d
	Index Count ^a	Total Count ^b			
Sea St. (south side), Dennis	0	0	0	0	Dennis, MAS
Bayview, Dennis	0	0	0	0	Dennis, MAS
Inman St. Beach, Dennis	0	0	0	0	Dennis, MAS
Chapin Beach, Dennis	3	3	1	3	Dennis, MAS
Mayflower Beach, Dennis	1	1	0	1	Dennis, MAS
Corporation Beach, Dennis	0	0	0	0	Dennis, MAS
Howes St. Beach, Dennis	0	0	0	0	Dennis, MAS
Sesuit Harbor Beach, Dennis	0	0	0	0	Dennis, MAS
Cold Storage Beach, Dennis	0	0	0	0	Dennis, MAS
Sea St. (north side), Dennis	0	0	0	0	Dennis, MAS
Coles Pond, Dennis	0	0	0	0	Dennis, MAS
Crowes Pasture / Quivett Neck, Dennis	0	0	0	0	Dennis, MAS
Wings Island, Brewster	1	1	1	1	MAS, Brewster, CCMNH
Paine's Creek, Brewster	0	nd	nd	0	MAS
Mants Landing, Brewster	0	nd	nd	0	MAS
Robbins Hill Beach, Brewster	0	nd	nd	0	MAS
Saint's Landing, Brewster	nd	nd	nd	nd	nd
Breakwater Beach, Brewster	0	nd	nd	0	MAS
Point of Rocks Landing, Brewster	0	nd	nd	0	MAS
Ellis Landing, Brewster	nd	nd	nd	nd	nd
Linell Landing Beach, Brewster	0	nd	nd	0	MAS
Crosby Landing Beach, Brewster	1	2	2	2	MAS
Earle Rd. Beach, Harwich	nd	nd	nd	nd	nd
Grey Neck Road Beach, Harwich	nd	nd	nd	nd	MAS
Allens Harbor, Harwich	0	0	0	0	MAS
Belmont Condos, Harwich	1	1	2	1	MAS
Bank St./Merkel Beach/Wychmere, Harwichport	2	2	5	2	MAS

Location	<u>Number of pairs</u>		No. chicks fledged ^c	No. pairs with fledge data ^c	Source ^d
	Index Count ^a	Total Count ^b			
Saquatucket Shores, Harwich	0	nd	nd	nd	MAS
Saquatucket Bluffs, Harwich	0	0	0	0	MAS
Red River Beach, Harwich	1	1	2	1	MAS
LOWER CAPE					
Pleasant St. Beach, Chatham	1 ^q	1 ^q	0	1 ^q	MAS
Forest Beach, Chatham	1 ^q	2 ^q	3	2 ^q	MAS
Cockle Cove, Chatham	0	0	0	0	MAS
Ridgevale Beach, Chatham	2	2	4	2	MAS
Harding Shores, Chatham	0	0	0	0	MAS
Harding Beach, Chatham	3	3	8	3	MAS
Harding Beach Point, Chatham ^r	0	nd	nd	0	MAS
North Monomoy Island, Chatham	0	0	0	0	USFWS
Minimoy Island, Chatham ^s	0	0	0	0	USFWS
South Monomoy Island, Chatham	32	33	77	33	USFWS
South Beach, Chatham	43	46	64	46	MAS
Morris Island dredge spoil, Chatham	0	nd	nd	0	MAS
Tern Island, Chatham	0	0	0	0	MAS
Claflin Landing/ Chatham Bars Inn, Andrew Harding Way, Chatham	0	nd	nd	0	MAS
Linnell Lane, Chatham	0	nd	nd	0	MAS
North Beach Island, Chatham	7	8	8	8	Chatham
North (Nauset) Beach, Chatham	3	3	7	3	Orleans
North (Nauset) Beach, Orleans	11	11	12	11	Orleans
Nauset Spit (Heights), Orleans	19	21	23	21	Orleans
New Island, Orleans/Eastham	0	0	0	0	NPS, Orleans
Skaket Beach, Orleans	0	0	0	0	Orleans
Rock Harbor (north side), Eastham	0	nd	nd	0	MAS

Location	<u>Number of pairs</u>		No. chicks fledged ^c	No. pairs with fledge data ^c	Source ^d
	Index Count ^a	Total Count ^b			
First Encounter Beach, Eastham	0	0	0	0	MAS
So. Sunken Meadow Spit, Eastham	3	3	4	3	MAS
Coast Guard Beach, Eastham	8	8	2	8	NPS
Nauset Light Beach, Eastham	0	0	0	0	NPS
Marconi Beach, Wellfleet	6	6	5	6	NPS
Marconi Station, Wellfleet	0	0	0	0	NPS
Lecount Hollow, Wellfleet	1	1	0	1	NPS
White Crest Beach, Wellfleet	1	1	1	1	NPS
Cahoon Hollow, Wellfleet	0	0	0	0	NPS
Lieutenant Island, Wellfleet	2	2	4	2	MAS
Field Point /Fox Is. WMA, Wellfleet	1	1	0	1	MAS, DFW
Indian Neck / The Cove, Wellfleet	0	nd	nd	0	MAS
Jeremy Point/Great Is., Wellfleet ^t	10	10	23	10	NPS
Duck Harbor, Wellfleet ^t	6	6	1	6	NPS
Bound Brook, Wellfleet ^t	2	2	3	2	NPS
Ryder Beach, Truro	1 ^u	1 ^u	3 ^u	1 ^u	NPS
Fisher Beach (Pamet Harbor -South), Truro	2 ^u	3 ^u	3 ^u	3 ^u	MAS
Corn Hill Beach (Pamet Harbor - North), Truro	4	4	8	4	MAS
Pond Village Beach, Truro	nd	nd	nd	nd	nd
Pilgrim Beach/Beach Point, Truro	3	3	4	3	MAS
Newcomb Hollow, Wellfleet/ Truro	2	2	3	2	NPS
Ballston Beach, Truro	4	5	13	5	NPS
Longnook Beach, Truro	0	0	0	0	NPS
Highland Beach, Truro	0	0	0	0	NPS
Coast Guard Beach, Truro	1	1	1	1	NPS
Dead Forest / Head of the Meadow / High Head, Truro ^v	5	5	7	5	NPS

Location	<u>Number of pairs</u>		No. chicks fledged ^c	No. pairs with fledge data ^c	Source ^d
	Index Count ^a	Total Count ^b			
Race Point-South Beach, Provincetown / Truro ^w	14	14	26	14	NPS
Race Point-North/Hatches Harbor, Provincetown ^x	10	10	21	10	NPS
Long Point/Wood End, Provincetown	7	7	18	7	NPS
Herring Cove Beach, Provincetown ^y	0	0	0	0	NPS
BRISTOL COUNTY					
Stony Point Dike, Wareham	3 ^j	2 ^j	5	2 ^j	ACOE
Long Beach Point, Wareham	0	1	0	1	MAS
Little Harbor Beach, Wareham	1	1	3	1	MAS
Ram Is., Mattapoissett	0	0	0	0	DFW
Strawberry Point, Mattapoissett	1	2	2	1	MAS
West Island, Fairhaven	4	4	12	4	LCE
Winsegansett Heights, Fairhaven	0	0	0	0	LCE
Round Hill Beach, Dartmouth	0	0	0	0	MAS
Salters Pond, Dartmouth	1	1	0	1	MAS
Nonquitt, Dartmouth	3	3	7	3	MAS
Demarest Lloyd State Park, Dartmouth	2	3	5	3	LCE
Little Beach/Barney's Joy, Dartmouth	13	13	13	13	MAS
Gooseberry Neck, Westport	1	1	0	1	LCE
Horseneck Beach State Reservation, Westport ^z	7	7	9	7	LCE, MAS
Westport Town Beach / Baker's Beach, Westport ^z	1	2	0	2	MAS
Acoaxet, Westport	1	1	1	1	TNC-RI
Cockeast Pond, Westport	1	1	4	1	TNC-RI
Richmond Pond, Westport	2	2	4	2	TNC-RI
Bay Point, Swansea	0	0	0	0	A. Waring

Location	<u>Number of pairs</u>		No. chicks fledged ^c	No. pairs with fledge data ^c	Source ^d
	Index Count ^a	Total Count ^b			
ELIZABETH ISLANDS					
Naushon Island	3 ^{aa}	3 ^{aa}	nd ^{aa}	0 ^{aa}	DFW, MAS
Pasque Island-Robinson's Hole	1 ^{bb}	1 ^{bb}	nd ^{bb}	0 ^{bb}	DFW, MAS
Pasque Island-Cobbly	nd	nd	nd	nd	nd
Pasque Island-Quicks Hole	0 ^{bb}	nd	nd	0	DFW, MAS
Nashawena Island-Quicks Hole	1 ^{cc}	1 ^{cc}	nd ^{cc}	0 ^{cc}	DFW, MAS
Nashawena Island-Canapitsit	0 ^{cc}	nd	nd	0	DFW, MAS
Cuttyhunk Island, Gosnold	0 ^{dd}	nd ^{dd}	nd	0 ^{dd}	DFW, MAS
Penikese Island, Gosnold	0	0	0	0	DFW
MARTHA'S VINEYARD					
Eastville Beach, Oak Bluffs	0	0	0	0	MAS
Harthaven, Oak Bluffs	1	1	4	1	MAS
Sylvia State Beach, Edgartown / Oak Bluffs	3	3	4	3	MAS
Sarson Is., Oak Bluffs	0	0	0	0	MAS
Little Gravel Is., Oak Bluffs	0	0	0	0	MAS
Big Gravel Is., Oak Bluffs	0	0	0	0	MAS
Haystack Is., Edgartown	0	0	0	0	MAS
Cow Bay, Edgartown	0	0	0	0	MAS
Yorke – Allen Point, Edgartown	0	nd	nd	0	MAS
Eel Pond / Little Beach / Lighthouse Beach, Edgartown	2 ^{ee}	2 ^{ee}	0	2	MAS
Chappaquiddick Point Beach, Chappaquiddick	nd	nd	nd	nd	nd
Cape Pogue Elbow / The Narrows, Chappaquiddick	3	3	7	3	TTOR
Little Neck, Chappaquiddick	0	0	0	0	TTOR
Arruda's Point / The Jetties, Chappaquiddick	0 ^{ff}	0 ^{ff}	0	0	TTOR

Location	<u>Number of pairs</u>		No. chicks fledged ^c	No. pairs with fledge data ^c	Source ^d
	Index Count ^a	Total Count ^b			
Leland / East Beach, Chappaquiddick	3	4	6	4	TTOR
Wasque, Chappaquiddick	0	0	0	0	TTOR
Norton Point Beach, Chappaquiddick	0	0	0	0	TTOR
Norton Point Beach, Edgartown	2	2	3	2	TTOR
South Beach, Edgartown	0	nd	nd	0	MAS
Crackatuxet Pond, Edgartown	nd	nd	nd	nd	nd
Edgartown Great Pond, Edgartown	4	4	3	4	MAS, MVLB
Jobs Neck, Edgartown	nd	nd	nd	nd	nd
Paqua Pond, Edgartown	0	nd	nd	0	MAS
Oyster Pond, Edgartown	0	0	0	0	MAS
Watcha Pond, W. Tisbury	1	1	3	1	MAS
Long Point, Chilmark	0	0	0	0	TTOR
Tisbury Great Pond / Quansoo, Chilmark	5	6	2	6	MAS, MVLB
Black Point Pond, Chilmark	1	1	0	1	MAS
Chilmark Pond, Chilmark	1	1	3	1	MAS
Lucy Vincent Beach, Chilmark	0	nd	nd	0	MAS
Stonewall Beach, Chilmark	0	0	0	0	MAS
Squibnocket Beach, Chilmark	1	1	0	1	MAS
Long Beach, Aquinnah	nd	nd	nd	nd	nd
Philbin Beach, Aquinnah	0	nd	nd	0	MAS
Moshup Beach, Aquinnah	0	0	0	0	MVLB
Dogfish Bar, Aquinnah	8	8	0	8	MAS
Lobsterville Beach, Aquinnah	2	2	2	2	MAS
Menemsha Beach, Chilmark	0	nd	nd	0	MAS
Lambert's Cove, West Tisbury	0	nd	nd	0	MAS
Cedar Tree Neck, W. Tisbury	0	nd	nd	0	MAS
Great Rock Bight Preserve, Chilmark	nd	nd	nd	nd	nd

Location	<u>Number of pairs</u>		No. chicks fledged ^c	No. pairs with fledge data ^c	Source ^d
	Index Count ^a	Total Count ^b			
Sepiessa Point Reservation, West Tisbury	0	0	0	0	MVLB
West Tashmoo, Tisbury	1	1	0	1	MAS
East Tashmoo, Tisbury	1	1	2	1	MAS
Wilfred's Pond / Mink Meadows Beach, Tisbury	4	4	7	4	MAS, MVLB
Northern Pines Shores, Tisbury	nd	nd	nd	nd	nd
Maciel Marine, Vineyard Haven	0	0	0	0	MAS
Nomans Land Island NWR	1	1	0	1	USFWS
NANTUCKET					
Great Point	1	1	0	1	TTOR, FWS
The Galls	2	3	4	3	TTOR
Coskata-West Beach ^{gg}	2	2	3	2	TTOR
Coatue	7	8	10	8	NCF
Coskata-East Beach ^{hh}	0	0	0	0	TTOR
Coskata Inlet/The Haulover ⁱⁱ	0	0	0	0	NCF
Wauwinet	1	1	0	1	MAS
Squam Pond / Squam Road	1	2	0	2	MAS, NCF
Quidnet/Sesachacha Pond	1	1	0	1	MAS
Low Beach	1	1	3	1	Nantucket
Tom Nevers	nd	nd	nd	nd	nd
Surfside	0	0	0	0	Nantucket
Hummock Pond	0	0	0	0	NCF
Smith Point / Esther Is., Nantucket ^{jj}	3	3	0	3	Nantucket
Eel Point	9	9	9	9	NCF
Dionis Beach	0	0	0	0	Nantucket
East Hallowell Lane	nd	1 ^{kk}	3	1 ^{kk}	MAS. Nantucket

Location	Number of pairs		No. chicks fledged ^c	No. pairs with fledge data ^c	Source ^d
	Index Count ^a	Total Count ^b			
Jetties Beach	2 ^{kk}	2 ^{kk}	1	2 ^{kk}	Nantucket
Monomoy, Nantucket	0	0	0	0	NCF
UMass Field Station, Nantucket	0	0	0	0	NCF
Quaise Point	0	0	0	0	Nantucket
Ram Island (Polpis Harbor)	0	0	0	0	NCF
Long Pond	0	0	0	0	NCF
Madaket Beach	0	0	0	0	Nantucket
Tuckernuck Island	5	5	5	5	TLT
Muskeget Island	≥ 5	6	0	4	MAS, CSI, TLT, LLNF
UNADJUSTED TOTALS	573	609.5 ^{ll}	873	601.5 ^{mm}	
ADJUSTED TOTALS	-	591ⁿⁿ	-	583^{oo}	

^a *Index Count* = number of pairs counted between 1-9 June 2010, the standardized *Index Count* period for the Atlantic Coast population.

^b *Total Count* = total number of territorial or breeding pairs present at a site for at least 2 weeks during the breeding season.

^c *Chicks fledged* are defined as chicks ≥ 25 days of age or observed in flight, whichever occurs first. *Number of pairs with fledge data* includes all pairs for which number of chicks fledged was determined; this includes not only pairs that successfully fledged chicks, but also pairs for which no nests were found, pairs that nested unsuccessfully, and pairs whose chicks failed to fledge.

^d Source = the primary source(s) that provided monitoring data: ACOE = U.S. Army Corps of Engineers, Barnstable = Town of Barnstable, CCMNH = Cape Cod Museum of Natural History, Chatham = Town of Chatham, CSI = College of Staten Island, DCR = Massachusetts Department of Conservation and Recreation, Dennis = Town of Dennis, DFW = Massachusetts Division of Fisheries and Wildlife, Duxbury = Town of Duxbury, FEM = Friends of Ellisville Marsh, LCE = Lloyd Center for the Environment, LLNF = Linda Loring Nature Foundation, MAS = Massachusetts Audubon Society, MVLB = Martha's Vineyard Land Bank, Nantucket = Town of Nantucket, NCF = Nantucket Conservation Foundation, NPS = National Park Service, Orleans = Town of Orleans, Plymouth = Town of Plymouth, TLT = Tuckernuck Land Trust, TNC-RI = The Nature Conservancy - Rhode Island Chapter, TTOR = The Trustees of Reservations, USFWS = U.S. Fish and Wildlife Service, WBNERR = Waquoit Bay National Estuarine Research Reserve.

^e We define North Salisbury Beach as the segment of beach from the Massachusetts/New Hampshire border south to the center of the town of Salisbury Beach; South Salisbury Beach is the segment of beach from the center of the town of Salisbury Beach south to the Merrimack River.

^f nd = no data available

^g Pair 1 from Fourth Cliff, Scituate lost their nest around 31 May and were believed to have renested at Third Cliff. This pair is tallied in the *Index Count* only for Third Cliff. It is included in *Total Count* and *Pairs with fledge data* for both sites, but is tallied only once in state totals.

^h Saquish, Plymouth, was reported as part of Duxbury Beach prior to 2001.

ⁱ Ellisville includes both Ellisville State Park and the private beach along the south side of Ellisville Harbor.

^j The pair at Mashnee Dike, Bourne, that abandoned their nest on 13 May and was last seen there on 14 May is believed to be the same pair that was observed feeding at Stony Point Dike, Wareham later in May and on 2 June. This pair is tallied in the *Index Count* for Stony Point Dike, and in the *Total Count* and *Pairs with fledge data* for Mashnee Dike only, because there was no evidence of courtship or territorial establishment during the time they were observed at Stony Point Dike.

^k At New Seabury Beach, Mashpee, an apparent pair of Piping Plovers was observed on 23 April, 24 May (acting defensively), 1 and 9 June, and 1 and 8 July. No nest was ever found.

^l At Scorton Neck, Sandwich, the male of pair 6 nested first with an unbanded female, lost the nest when the dune scarp above it collapsed and buried the eggs, then renested with a color-banded female. Accordingly, *Total Count* and *Pairs with fledge data* are reported as 6.5 pairs.

^m Scorton Shores includes the Sandwich portion of Bodfish Park.

ⁿ At Grays Beach, Yarmouth, 1 Piping Plover was observed on 5, 12, 26, and 29 May and 6 June. Two adults were observed feeding on 6 June, but it was unclear if they were a pair. Piping Plover tracks and scrapes were observed on 5, 12, and 31 May. No nest was found nor was there clear evidence of a breeding pair; these may have been feeding birds from nearby Chapin Beach or Sandy Neck.

^o At Seagull Beach, Yarmouth, a pair that nested in the parking lot and subsequently abandoned their nest on 5 June is suspected to have relocated approximately 250 m eastward to the beach at the Red Jacket Inn, Yarmouth, where a pair with 2, estimated 1-2 day-old chicks were discovered on 13 July. This pair is included in the *Index Count* for Seagull Beach and in *Total Count* and *Pairs with fledge data* for both sites, but is tallied only once in state totals.

^p At Miramar, Dennis, a second pair was observed between 5 April and 5 May, but no nest was ever found. We suspect this pair eventually moved west across Swan River and nested at South Village Beach, where a 4-egg clutch was discovered hatching on 31 May. This pair is tallied in the *Index Count* for South Village Beach and in *Total Count* and *Pairs with fledge data* for both sites, but is tallied only once in state totals.

^q At Pleasant St. Beach, Chatham, a pair that nested twice unsuccessfully and was present during the *Index Count* period is believed to have moved to Forest Beach and renested (first egg discovered on 19 June). This pair is tallied in the *Index Count* for Pleasant St. Beach and in *Total Count* and *Pairs with fledge data* for both sites, but only once in statewide tallies of *Total Count* and *Pairs with fledge data*.

^r Harding Beach Point, Chatham, has also been referred to as “Morris Island Dike”.

^s “Minimoy” Island, Chatham, is a small, low island that lies west of the north end of South Monomoy Island.

^t Data for Duck Harbor and Bound Brook in Wellfleet and Truro were reported as part of Jeremy Point / Great Island prior to 2001.

^u The pair reported here for Ryder Beach, Truro, was originally reported as pair 4 at Fisher Beach, Truro. However, this pair's nest was located much closer to Ryder Beach than to Fisher Beach (it was on the beach near Rolling Hill Road).

^v No plovers nested on the "Dead Forest" section of this site in 2010.

^w Race Point - South is the section of beach from the High Head ORV access point west to the Race Point access point. It includes the "Mission Bell", "Tasha's ", "Armstrong", and "Exit 9" sections of beach.

^x Data reported for Race Point - North, Provincetown, include pairs nesting near the western side of Hatches Harbor.

^y Prior to 2007, any plovers observed at Herring Cove Beach, Provincetown, were tallied as part of the Wood End / Long Point site.

^z Westport Town Beach (also known as Cherry and Webb Beach) and Baker's Beach were formerly reported as part of Horseneck Beach, but are reported separately here. Regular monitoring did not begin until 27 May at Westport Town Beach and Baker's Beach, so it is uncertain if one or more pairs of plovers established territories and nested at either site prior to 27 May, as in past years. Scrapes were observed in the Baker's Beach parking lot on 27 May and 1 June, and a beach club employee reported that Piping Plovers had been seen in the beach parking lot at least 2-3 weeks prior to 27 May.

^{aa} The entire coastline of Naushon Island was walked on 25-26 May 2010, including Big Weepecket Island, Uncatena Island, and Nonamessett Island. A pair of Piping Plovers with 4 chicks was at Crescent Beach and a territorial pair was at Tarpaulin Cove. Traditional nesting sites were surveyed on Naushon Island on 8 June: 2 pairs of Piping Plovers, each with a 4-egg nest, were observed at Tarpaulin Cove, and no plovers were observed at Kettle Cove, Crescent Beach, West Beach, and Robinson's Hole.

^{bb} The entire coastline of Pasque Island was surveyed on 24 May; one territorial Piping Plover was heard calling, flying back and forth over water between Pasque and Naushon. The beaches at Robinson's Hole and Quicks Hole were surveyed on 8 June 2010; a territorial pair of Piping Plovers was present at Robinson's Hole on that date.

^{cc} The entire coastline of Nashawena Island was walked on 24 May; a 4-egg Piping Plover nest was found at Quicks Hole. Beaches at Quicks Hole and Canapitsit on Nashawena were surveyed on 8 June 2010; at Quick's Hole, a pair with a 4-egg nest was present, as were 1-2 other adults that were feeding on the beach and behaved as if they did not have nests or chicks.

^{dd} On Cuttyhunk Island, no Piping Plovers were observed during a survey on 2 June of the following potential nesting beaches: Barge Beach, Copicut Beach (the north side of the harbor entrance, across the

channel from Barge Beach), the bathing beach west of the town harbor, and the beach on the east side of the inlet to Westend Pond. No Piping Plovers were observed during a survey of the entire Cuttyhunk coastline on 9 June.

^{ee} Lighthouse Beach, Edgartown, was only visited twice, on 25 May and 4 June. No Piping Plovers were observed during either survey.

^{ff} Although no breeding pairs were reported for Arruda's / Jetties on Chappaquiddick Island, it was noted on the census form that: "There was a pair that loafed and courted along this stretch of beach on and off all through May, no details were given, and both Index and Total Counts were reported as "zero".

^{gg} Coskata-West Beach refers to the beach along the Nantucket Sound side of Coskata, from the south end of The Galls south and west to the boundary of Coatue. This is the same area that was referenced as Coskata-North Beach in 1993 and as part of The Galls in 1991 and 1992. Census data for Great Point, The Galls, and Coskata-West Beach were not reported separately in 1996 or 1997.

^{hh} Coskata-East Beach refers to the beach along the eastern (Atlantic) side of Coskata, including the vicinity of the former washover at The Glades.

ⁱⁱ Coskata Inlet is the inlet from Nantucket Harbor into Coskata Pond.

^{jj} Smith Point, Nantucket and Esther Island reconnected during late winter and spring 2009, after having been breached and separated by a channel since mid-April 2007.

^{kk} After pair 1 at Jetties Beach, Nantucket, lost its nest 1B, it is believed to have renested to the west at East Hallowell Lane, where a 4-egg nest was found on 5 July. This pair is tallied in the *Index Count* for Jetties Beach. It is included in the *Total Count* and *Pairs with fledge data* for both sites, but is tallied only once in state totals.

^{ll} The *Unadjusted Total Count* is the sum of the *Total Counts* reported for all sites.

^{mm} The *Unadjusted Total Number of pairs with fledge data* is the sum of the *Number of pairs with fledge data* reported for all sites.

ⁿⁿ The *Adjusted Total Count* is the average of the *Index Count* and the *Unadjusted Total Count*, rounded to the nearest whole number of pairs.

^{oo} The *Adjusted Total Number of pairs with fledge data* is calculated by multiplying the *Unadjusted Total Number of pairs with fledge data* by the ratio of the *Adjusted Total Count* to the *Unadjusted Total Count*, and rounding to the nearest whole number of pairs.